Patent claims:

1) A polymerizable nanocomposite material in solid or gel form, containing

a) from 4.9 to 95.9% by weight of a soluble polymer;

b) from 4 to 95% by weight of a partially or fully condensed silane from the following group: acrylosilanes, epoxysilanes, acryloalkoxysilanes, acryloepoxysilanes, epoxyalkoxysilanes, alkoxysilanes and alkylalkoxysilanes, the silane having an inorganic condensation ratio of from 33 to 100% and an organic conversion ratio of from 0 to 95%;

c) from 0 to 60% by weight of an acrylate;

d) from 0.1 to 50% by weight of surface-modified nanoscale particles from the following group: oxides, sulfides, selenides, tellurides, halides, carbides, arsenides, antimonides, nitrides, phosphides, carbonates, carboxylates, phosphates, sulfates, silicates, titanates, zirconates, aluminates, stannates, plumbates and mixed oxides thereof;

e) from 0 to 50% by weight of a softener;

f) from 0 to 5% by weight of a thermal or photochemical crosslinking initiator, sensitizer, wetting agent, adhesion promoter, rheological additive, antioxidant, stabilizer, colorant, photochromic and thermochromic substance, or a combination thereof, in each case expressed in terms of the total weight (dry weight) of the nanocomposite material.

2) The nanocomposite material as claimed in claim 1, characterized in that the soluble polymer a) is a polyacrylate, polymethacrylate, polyepoxide, polyvinyl alcohol, polyvinyl acetate or polyvinyl butyral which is soluble in an organic solvent.

3) The nanocomposite material as claimed in claim 1 or 2, characterized in that the silane b) is methacryloxypropyltrimethoxysilane, acryloxypropyltrimethoxysilane, dimethyldimethoxysilane, dimethyldiethoxysilane, 3-glycidyloxy-propyltrimethoxysilane, vinyltriethoxysilane, methyltriethoxysilane or a combination thereof.

4) The nanocomposite material as claimed in at least one of claims 1 to 3, characterized in that the acrylate c) is methyl methacrylate or a diol diacrylate or diol dimethacrylate.

5) The nanocomposite material as claimed in at least one of claims 1 to 4, characterized in that the nanoscale particles d) are surface-modified with compounds containing (meth)acryl, allyl, vinyl, epoxy, hydroxyl, carboxyl or amino groups or a combination thereof.

6) The nanocomposite material as claimed in at least one of claims 1 to 5, characterized in that the nanoscale particles are surface-modified SiO_2, TiO_2, ZrO_2 or Ta_2O_5 particles.

7) The nanocomposite material as claimed in at least one of claims 1 to 6, containing from 0.1 to 30% by weight of a softener.

8) A process for the production of a nanocomposite material as claimed in one or more of claims 1 to 7, characterized in that the silane b) is partially or fully condensed by adding a hydrolyzer and optionally polymerized by UV irradiation, and mixed with one or more of the components a), c) to f), or the silane b) is first mixed with one or more of the components a), c) to f) and then condensed and optionally polymerized, and optionally organic solvent is subsequently removed.

9) Use of a nanocomposite material as claimed in one or more of claims 1 to 7 for the production of a planar material with a refractive index gradient.

10) A film with a refractive index gradient, consisting essentially of one or two transparent plastic films which are coated with a nanocomposite material as claimed in one or more of claims 1 to 7, in which a refractive index gradient has been produced by applying an electrical potential difference, electron irradiation, holography, lithography or by local illumination.

11) A process for the production of a film with a refractive index gradient as claimed in claim 10, characterized in that a nanocomposite material as claimed in one or more of claims 1 to 7 is applied to a transparent plastic film, organic solvent is allowed to evaporate, optionally the nanocomposite layer is laminated with a transparent cover film, a refractive index gradient is produced in the nanocomposite layer by applying an electrical potential difference, electron irradiation, holography, lithography or by local illumination, and the refractive index gradient is subsequently fixed by complete thermal and/or light-induced crosslinking of the nanocomposite material.